



ACST8082

Contingent Payments

Session 1, In person-scheduled-weekday, North Ryde 2022

Department of Actuarial Studies and Business Analytics

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General Information

Unit convenor and teaching staff

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Credit points

10

Prerequisites

(ACST881 or ACST8081) and (STAT810 or STAT8310 or STAT806)

Corequisites

Co-badged status

Unit description

This unit covers the analysis of cash flows dependent on uncertain events due to mortality and other factors. It introduces the concept of the expected present value of payments under various life insurance contracts, including whole life, term and endowment assurances; immediate and temporary annuities; and deferred assurances and annuities. The standard international actuarial notation in life insurance is used extensively. Probability models and life tables are used to calculate the expected present values accurately based on ultimate or select mortality. Furthermore, important concepts of pricing and reserving for future contingent liabilities are discussed. Equations of value are established to calculate net premiums. Prospective and retrospective net premium reserves required to meet future liabilities are determined and compared. Techniques for the valuation of annuity and assurance products involving two lives are developed. Students gaining a credit average in both ACST8081 and ACST8082 (minimum mark of 60 on both units) will satisfy the requirements for exemption from the professional subject CM1 of the Actuaries Institute.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Interpret and apply simple survival models as well as ultimate and select mortality

rates.

ULO2: Apply contingent payment techniques to determine actuarial present values and variances of benefits for simple life insurance contracts and for contracts contingent on two lives.

ULO3: Calculate premiums and policy values for various life insurance contracts, both with and without allowance for operating expenses.

ULO4: Analyse the profit arising from life insurance contracts in simple scenarios.

ULO5: Identify key unit concepts and to integrate them to solve and analyse novel problems.

ULO6: Explain how the contingent payment techniques can be applied to complex life-contingent problems.

General Assessment Information

Late submissions of assessments Unless a Special Consideration request has been submitted and approved, no extensions will be granted. There will be a deduction of 10% of the total available assessment-task marks made from the total awarded mark for each 24-hour period or part thereof that the submission is late. Late submissions will only be accepted up to 96 hours after the due date and time.

No late submissions will be accepted for timed assessments – e.g., quizzes, online tests.

Table 1: Penalty calculation based on submission time

Submission time after the due date (including weekends)	Penalty (% of available assessment task mark)	Example: for a non-timed assessment task marked out of 30
< 24 hours	10%	10% x 30 marks = 3-mark deduction
24-48 hours	20%	20% x 30 marks = 6-mark deduction
48-72 hours	30%	30% x 30 marks = 9-mark deduction
72-96 hours	40%	40% x 30 marks = 12-mark deduction
> 96 hours	100%	Assignment won't be accepted

Special Consideration

To request an extension on the due date/time for a timed or non-timed assessment task, you must submit a Special Consideration application. An application for Special Consideration does not guarantee approval.

The approved extension date for a student becomes the new due date for that student. The late submission penalties above then apply as of the new due date.

Assessment Tasks

Name	Weighting	Hurdle	Due
Online Quiz	5%	No	Week 3
Assignment	15%	No	Week 8
Class Test	20%	No	Week 10
Final Exam	60%	No	University Examination Period

Online Quiz

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 2 hours

Due: **Week 3**

Weighting: **5%**

You should complete the quiz online, available on iLearn.

On successful completion you will be able to:

- Interpret and apply simple survival models as well as ultimate and select mortality rates.

Assignment

Assessment Type ¹: Quantitative analysis task

Indicative Time on Task ²: 15 hours

Due: **Week 8**

Weighting: **15%**

This is an individual assignment which focuses on problem solving using Excel spreadsheet.

On successful completion you will be able to:

- Interpret and apply simple survival models as well as ultimate and select mortality rates.
- Apply contingent payment techniques to determine actuarial present values and variances of benefits for simple life insurance contracts and for contracts contingent on two lives.
- Calculate premiums and policy values for various life insurance contracts, both with and without allowance for operating expenses.
- Identify key unit concepts and to integrate them to solve and analyse novel problems.
- Explain how the contingent payment techniques can be applied to complex life-contingent problems.

Class Test

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 10 hours

Due: **Week 10**

Weighting: **20%**

The test will be approximately 90 minutes, to be held during class time.

On successful completion you will be able to:

- Interpret and apply simple survival models as well as ultimate and select mortality rates.
- Apply contingent payment techniques to determine actuarial present values and variances of benefits for simple life insurance contracts and for contracts contingent on two lives.
- Calculate premiums and policy values for various life insurance contracts, both with and without allowance for operating expenses.
- Analyse the profit arising from life insurance contracts in simple scenarios.
- Identify key unit concepts and to integrate them to solve and analyse novel problems.

Final Exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 28 hours

Due: **University Examination Period**

Weighting: **60%**

The final examination will be closed book, a three-hour written paper with ten minutes reading time, to be held during the University Examination period.

On successful completion you will be able to:

- Interpret and apply simple survival models as well as ultimate and select mortality rates.
- Apply contingent payment techniques to determine actuarial present values and variances of benefits for simple life insurance contracts and for contracts contingent on two lives.
- Calculate premiums and policy values for various life insurance contracts, both with and without allowance for operating expenses.
- Analyse the profit arising from life insurance contracts in simple scenarios.
- Identify key unit concepts and to integrate them to solve and analyse novel problems.
- Explain how the contingent payment techniques can be applied to complex life-contingent problems.

¹ If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

² Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Classes

Timetable is available at <https://timetables.mq.edu.au/2022/>. Please see iLearn for further details on class delivery.

Classes on tutorial questions will commence in week 2 of the session. Students are expected to have attempted the previous weeks tutorial questions before coming to this class.

If you are enrolled into the "Online-flexible" attendance mode, you are not required to register into any classes as there is no real-time live online class. A lecture recording will be made available to students after the on-campus class is held.

Required and Recommended Texts and/or Materials

No textbooks are prescribed for this unit. Detailed lecture notes, exercises and solutions are available on the unit's iLearn site.

Technology Used and Required

You will require a calculator. For the final exam, you may only use non-programmable calculators which are not able to store text.

You will also need to be able to construct spreadsheets for tutorial exercises. You will also be required to use a spreadsheet for the assignment. We do not prescribe any particular brand of spreadsheet, although materials will be provided in MS Excel.

You require access to a computer to access material on the unit's iLearn web site.

Required unit materials

Course materials, including pre-recorded lectures, are available on the iLearn page.

To access the teaching website, go to <http://ilearn.mq.edu.au> and login using your usual login and password.

Inherent requirements

Attendance of the weekly lectures and tutorials, either via face-to-face venue or the pre-uploaded recordings.

Unit Schedule

Week	Week Begins	Topics covered in lectures	Assessment
1	21 Feb	Life tables and survival models	
2	28 Feb	Valuing single payment benefits	
3	7 Mar	Valuing life annuities	Quiz
4	14 Mar	Select mortality Net premiums	
5	21 Mar	Policy values	
6	28 Mar	Variable benefits	
7	4 Apr	Operating expenses Profit testing	
----- 2 week study break -----			
8	25 Apr	Participating policies	Assignment
9	2 May	Analysis of profits Profit loading	
10	9 May	Joint life and last survivor statuses (class test)	Class test
11	16 May	Joint life and last survivorship benefits	
12	23 May	Contingent and reversionary benefits	
13	30 May	Revision	

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)

- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies](https://students.mq.edu.au/support/study/policies) (<https://students.mq.edu.au/support/study/policies>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central](https://policies.mq.edu.au) (<https://policies.mq.edu.au>) and use the [search tool](#).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)

Student Enquiries

Got a question? Ask us via [AskMQ](#), or contact [Service Connect](#).

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.